

# **Underfilled Launch / N.A. Test Summary**

**•• with 62.5/125  $\mu\text{m}$  Optical Fiber ••**

**Presentation to ANSI X3T11 - HIPPI 6400 Optical Working Group**

**December 3, 1996 ..... Bloomington, MN**

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## **GOAL**

***To perform physical measurement of beam exit  
"numerical aperture" at a M.M fiber output,  
using underfilled fiber launch conditions.***

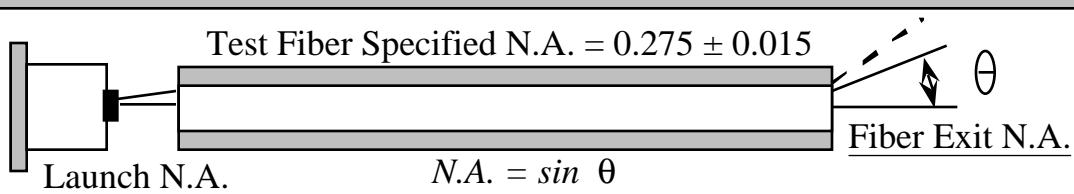
## **TEST PARAMETERS**

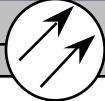
- 850 nm Optical Launch Wavelength
- Test Fibers: 62.5/125  $\mu\text{m}$  Graded-index Fibers  
/ Spec'd N.A. =  $0.275 \pm 0.015$
- Physical contact connections were used throughout.



# MEASUREMENT RESULTS

<b>Launch N.A.</b>	<b>Test Fiber Length</b>	<b>Median Fiber Exit N.A.</b>
0.201	100 meters	0.214
0.157	2 meters	0.145
	10 meters	0.145
	100 meters	0.143
0.147	2 meters	0.133
	10 meters	0.139
	100 meters	0.133





## CONCLUSIONS

- Fiber Exit Beam N.A. tends to follow the Source Launch Angle for LAN-type graded-index multimode optical fibers.
- This is GOOD for underfilled-launch Bandwidth enhancement.
- The Data suggests Laser Safety calculations or models can not rely on M.M. fiber numerical aperture specifications.

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- Further Study:
  - Broaden Launch N.A. Range, Multiple Fibers, Concatenation, Step-Index & 50  $\mu\text{m}$  core fibers.
- Special Thanks to: Dr. Jim Onstott, Dr. Mike Messerly, Bob Budewitz & Souksamay Chounlamontry